WHAT'S WRONG WITH MY SPRUCE TREE?

Rhonda Kurtz
Manitoba Agriculture

Spruce trees are one of the most commonly grown ornamental and shelterbelt trees in Manitoba. Spruce will thrive in a site that is to their liking. Optimum growing conditions include soil that is acidic, course texture for good drainage and in a location sheltered from extreme weather conditions with an ample but even supply of water. A spruce tree planted in a poor location will begin to decline in vigor and thus become susceptible to attack from diseases and insects.

Spruce problems can be divided into three categories: physiological, disease and insects.

Physiological Problems

Physiological problems in spruce include a condition known as evergreen browning and it is caused by excessive water loss. In the late part of the winter and early spring many spruce trees take on a reddish brown appearance usually more toward their branch tips. Unlike deciduous trees, spruce keep their needles year round. About March, when air temperatures increase, spruce needles will start to transpire water. However as their roots are bound in ice, they cannot take up any to replace what is being lost through the needles. This moisture deficit causes the needles to brown. Strong winds will also cause water stress to exposed needles, which is why evergreen browning tends to occur on the areas most exposed to the southwest. To diminish this effect make sure trees are well watered in late fall before freeze up, and where possible trees should be protected with a board or burlap sunscreen. When planting spruce for ornamental purposes it is a good idea to avoid planting them

in exposed areas. As spruce trees are shallow rooted, they require watering almost constantly during periods of hot, dry weather. The best time to do this is at night when the water has a better chance of soaking into the soil around the roots as opposed to mostly evaporating during the heat of the day. Trees that do not get enough water during hot, dry weather tend to suffer from needle browning and occasionally branch dieback.

Usually in late August or early September, coniferous trees will naturally shed their third year needles. During this time the innermost needles will turn brown and drop off. Although this process takes place every year, in some years it becomes more pronounced and can be mistaken for a disease or insect problem.

Disease

One of the most common and destructive diseases of spruce is called cytospora canker. It is caused by the fungus Cytospora kunzei. Usually older trees fall victim. This disease is characterized by browning and death of entire branches starting at the bottom and continuing upward. Occasionally branches higher up are attacked even though lower ones remain healthy. White crusty or resinous patches called cankers will appear on the dead and dying branches and even on the trunk. Pitch may ooze from these cankers and drip onto lower branches. During periods of wet weather these cankers produce spores that disseminate to cause new infections. Pruning out areas affected by cytospora is the only means of control once the disease has been initiated. This must be done when the weather is dry, as wet weather pruning can spread the disease faster. Pruning tools should be sterilized between cuts with 70% alcohol, methyl

hydrate or javex. All diseased material should be removed or destroyed as soon as possible after pruning as spores can be released from diseased material for a long time after being removed from the tree.

Another very common disease problem are fungal needle casts. There are several different species that can attack spruce, and they are characterized by irregular tan, yellow, red-orange, reddish brown or black spots, specks or bands being produced on the second year needles. Affected needles generally drop early. Twigs of infected trees appear stunted and may dieback. As with cytospora, needle casts invade trees that have been under stress. To prevent needle cast diseases spreading, the new needles should be protected by applying a fixed copper fungicide just as growth begins in spring. Repeat applications 3 or 4 times at 10 day intervals.

Insects

Although there are many different insects that will attack spruce trees, there are some that are mainly a problem in ornamental spruces under stress conditions.

All evergreen trees seem to have a resident population of spider mites. Under cool, rainy conditions their numbers remain low. However during hot dry spells populations explode. As spider mites are so tiny they can rarely be seen except with the aid of a magnifying glass, it is difficult for most people to tell if indeed their trees do have a mite problem. Visual symptoms begin as a dingy yellow appearance to the needles which later progress to being brown and dry after which needles drop. There should also be a mesh of fine webbing, usually barely noticeable between the needles. In severe or prolonged infestaions dust particles,

shed needles and dead mites become caught in the webbing giving the tree an unhealthy appearance. Damage to the tree is done by both adult and nymphs, sucking sap from the needles. Mites can be controlled by using dicofol (Kelthane) at a rate of 62 ml/5 l (2 oz/gal) of water. Usually 2 applications are required about 10-14 days apart.

Similar damage can be caused by the spruce needle miner, except in this case, silken webbing may contain dead needles and frase (droppings). Damage is done after tiny larvae hatch from eggs that have been layed along the sides of a needle, and begin to chew a hole at the base of it. The insect will then feed on the entire contents of the needle and exit from the same hole in search of new needles. Full-grown larvae are green with a brown head and are about 6 mm long. The larvae remain active until October when they construct a cocoon inside a nest of dead needles and frase to overwinter. Pupation begins in early May and continues until early June. Adults emerge as small grayish brown moths that grow to have a 12 mm wingspan. If a tree has a large number of needle miner nests it can appear quite unsightly, as airborne material such as dust and poplar cotton become easily caught in them. Heavy infestations can severely weaken the tree through loss of needles.

Before bud break in spring the nests can be washed away with a strong stream of water from a garden hose. The debris should then be gathered and destroyed. This may reduce the current years infestation. Dimethoate (Cygon 2E) at a rate of 2 ml/5 l (2 tsp/gal) can be used to chemically control needle miners. Trees should be sprayed in early July.

Another very common pest of spruce is the white pine needle scale.

An infestation of these insects will be evident by tiny white flecks on the needles that resemble paint. Each white scale contains a dead body of a female scale insect and her overwintering eggs. The new nymphs called (crawlers) hatch usually in early June, then disperse to settle on the surface of both new and old needles to feed. During the summer the crawlers moult to become adults after which they begin to secrete a white scale covering. Males emerge from under the scale as tiny winged insects to mate with the wingless females in late July. Egglaying begins in mid-August and continues until late October. During this time the body of the female shrinks to provide extra space for the egg accumulation under the scale.

Scale insect feeding damage causes large yellow areas on the needles that can coalesce if the population density becomes excessively high. Sustained heavy attack for 2 or more years can cause many spruce to lose most of their needles.

The most effective chemical for control is Dimethoate (Cygon) used at 10 ml/5 l (2 tsp/gal) of water. Trees should be sprayed as soon as possible after all insects have hatched to minimize feeding damage. A second treatment in mid August may be necessary to kill any females that survived the first treatment.